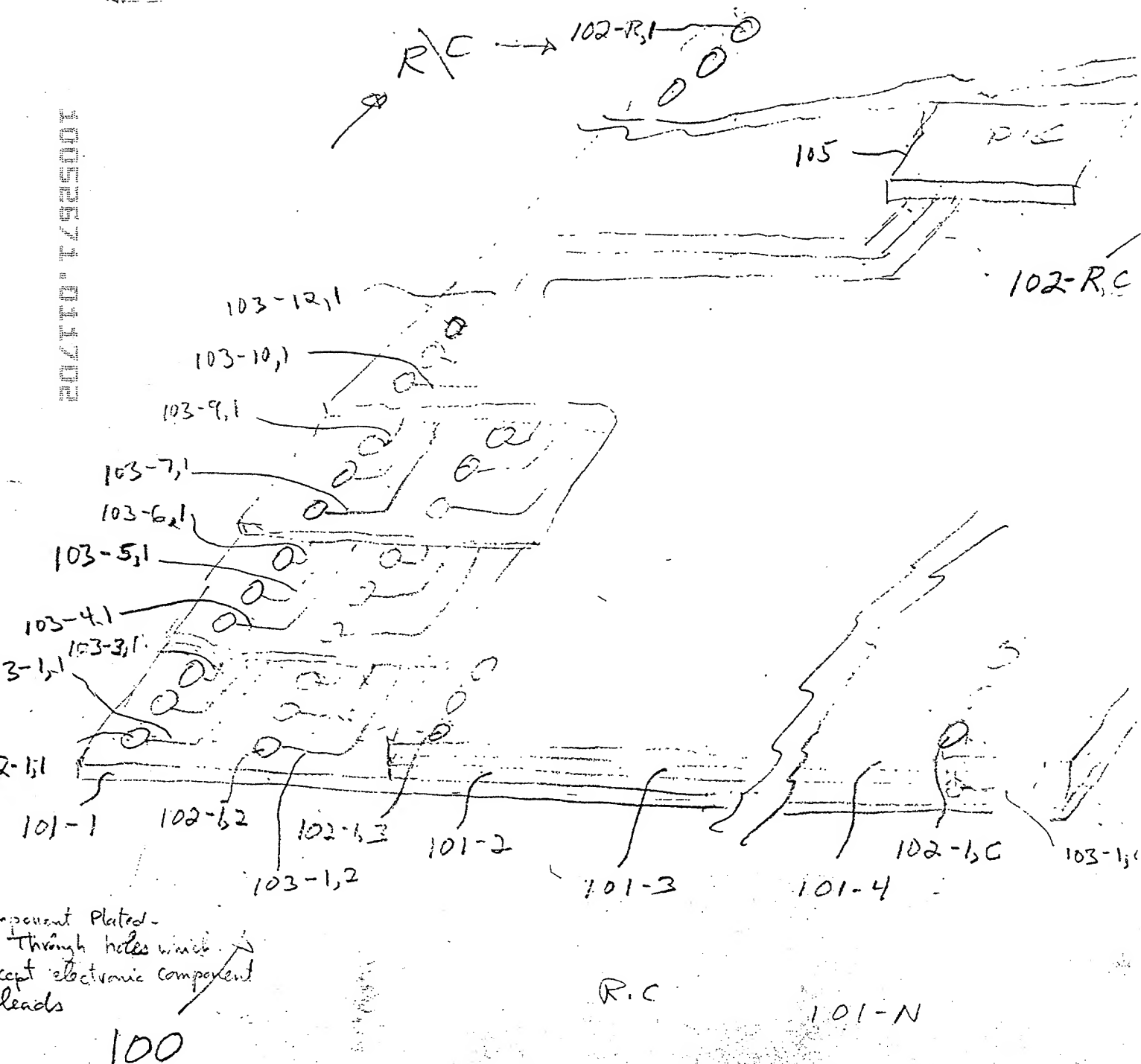


Through holes which accept electronic component leads



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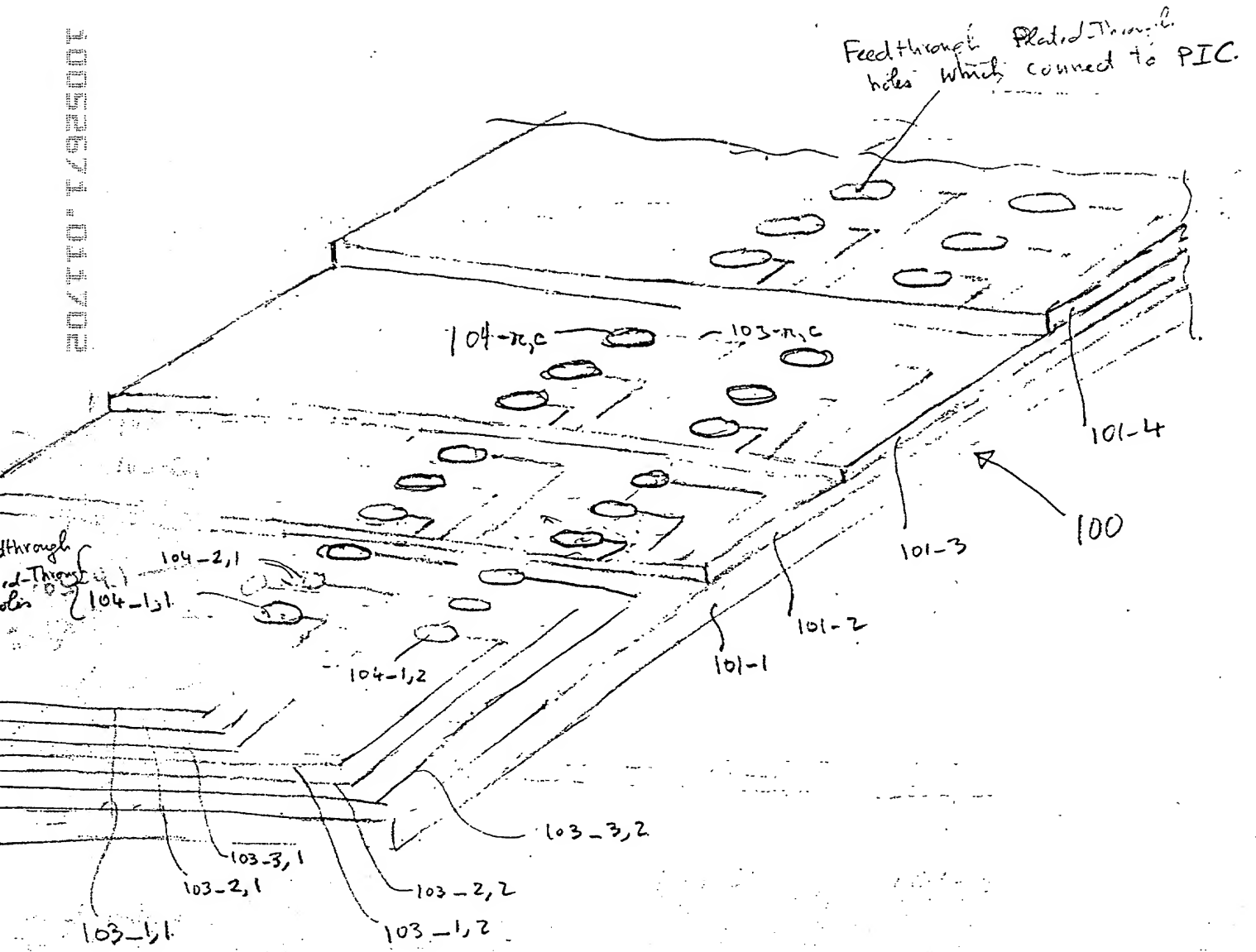


FIGURE 1B

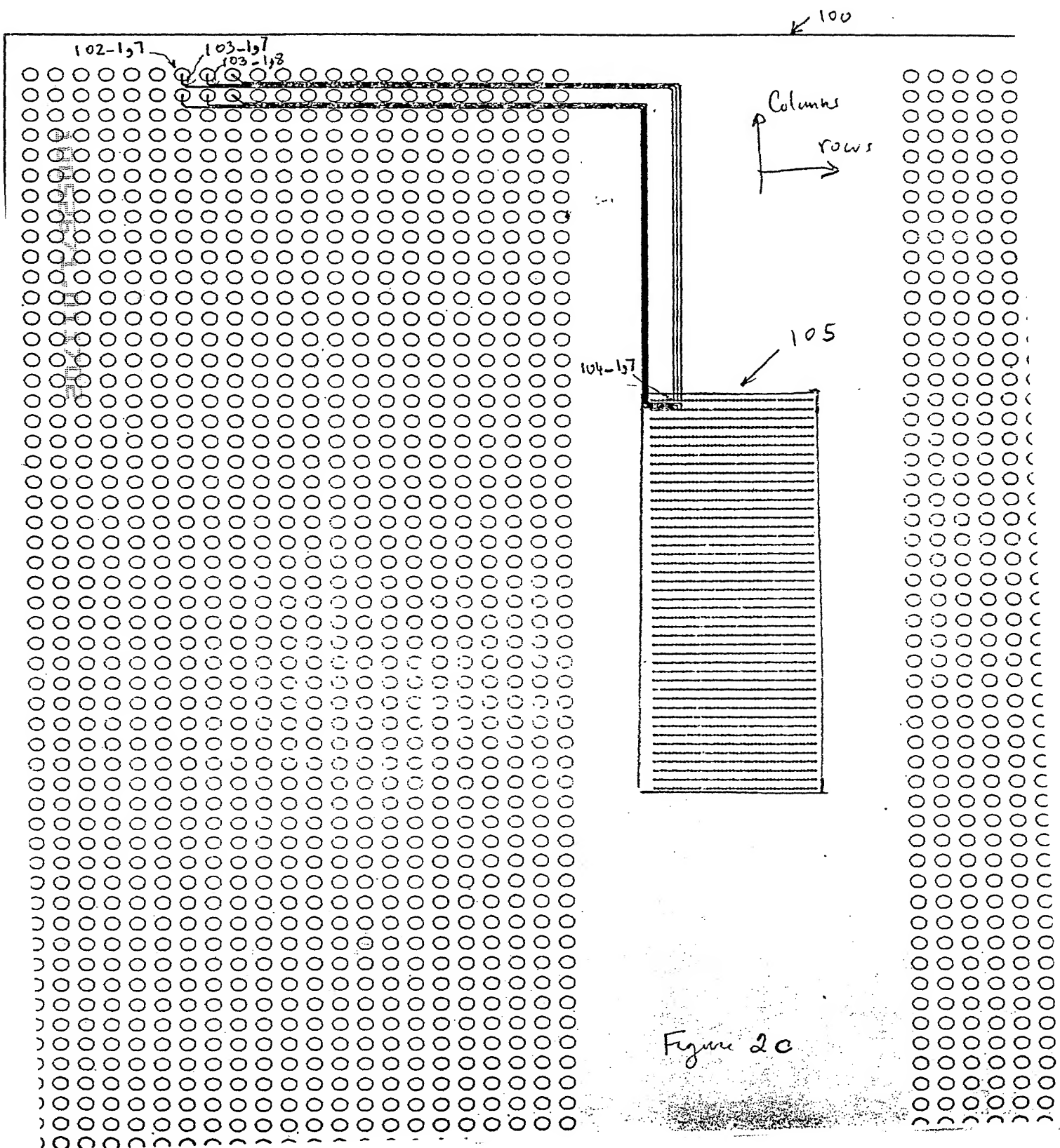
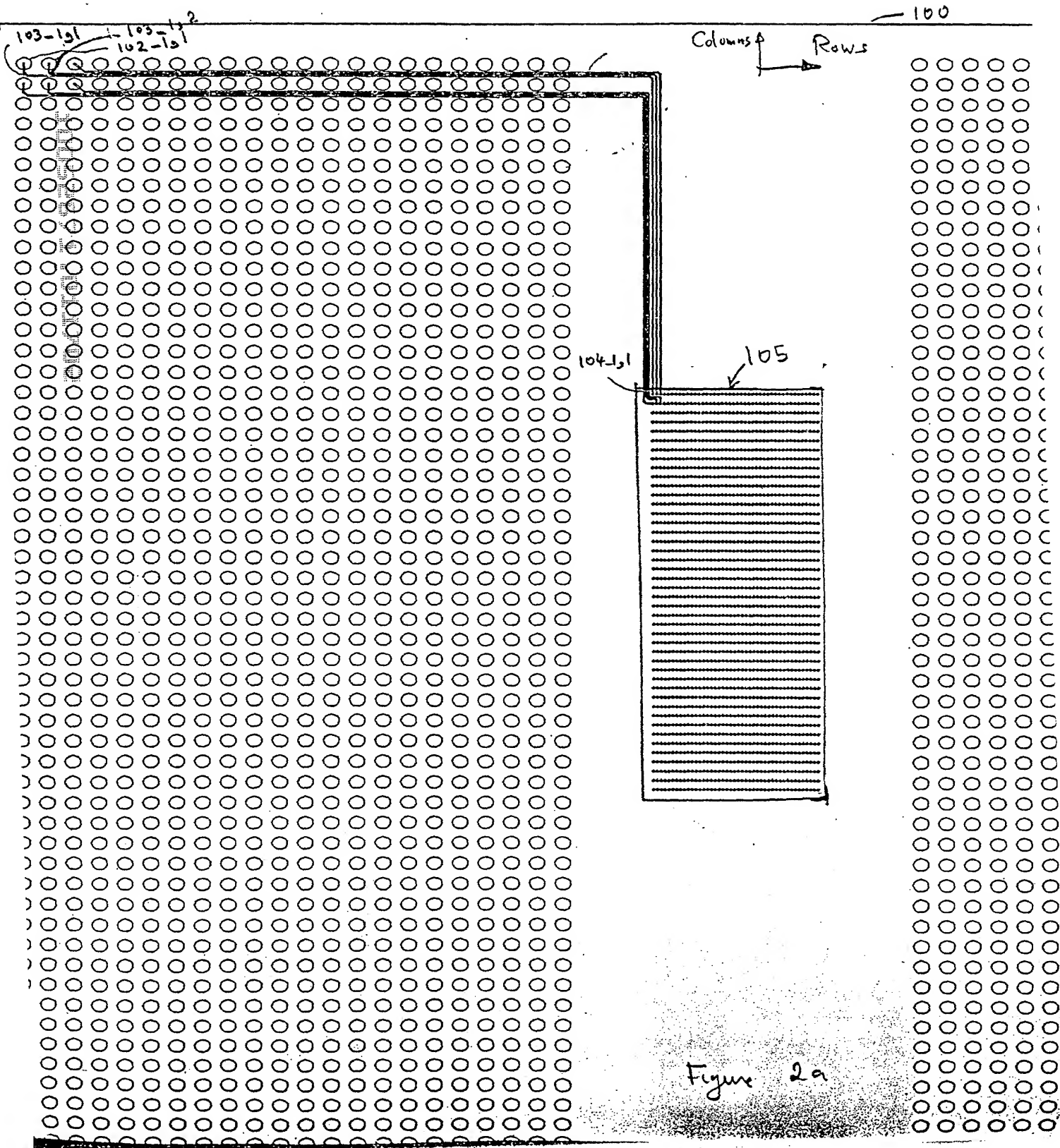


Figure 2c



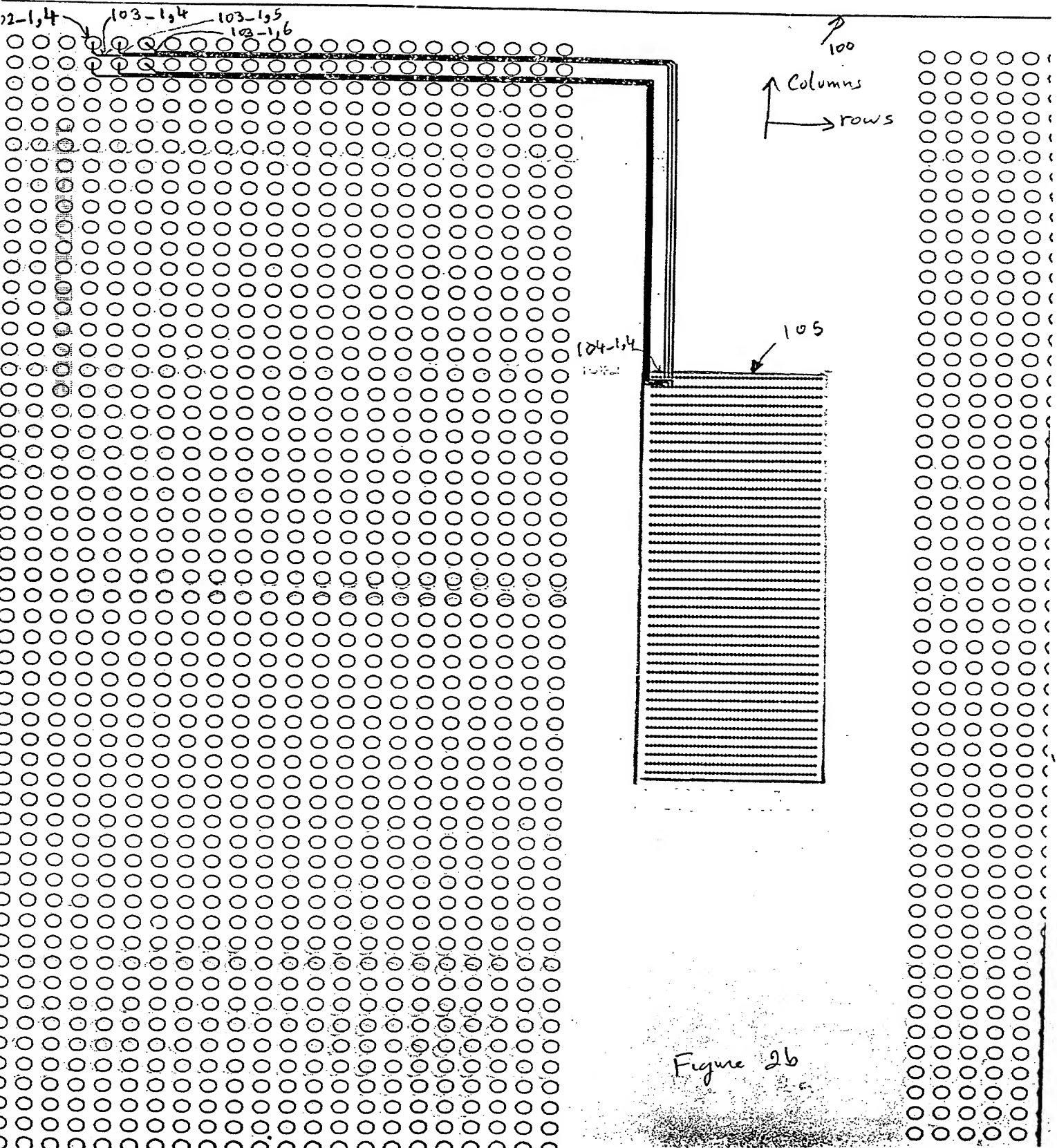
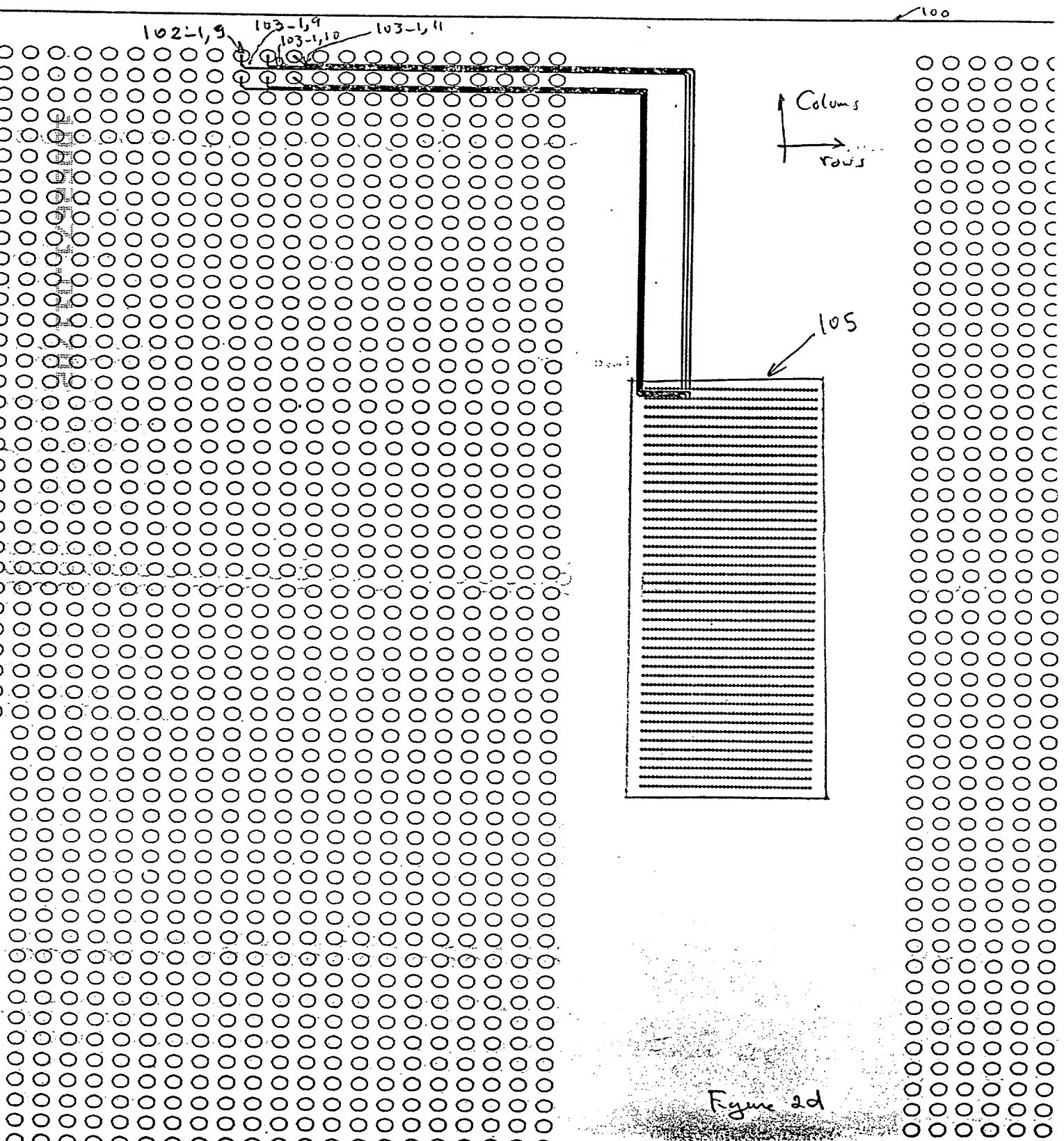


Figure 2b



# GLOBAL INTERCONNECT ARCHITECTURE

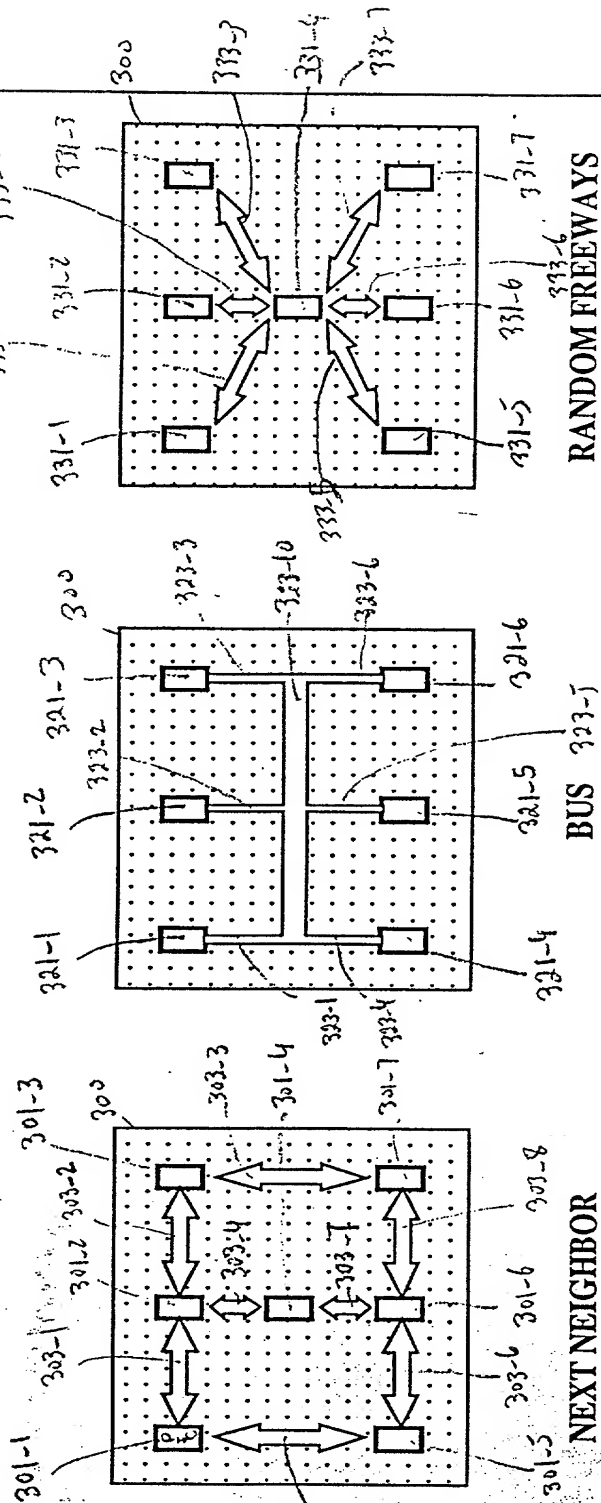


Figure 3a

Figure 3b

Figure 3c

Next Neighbor

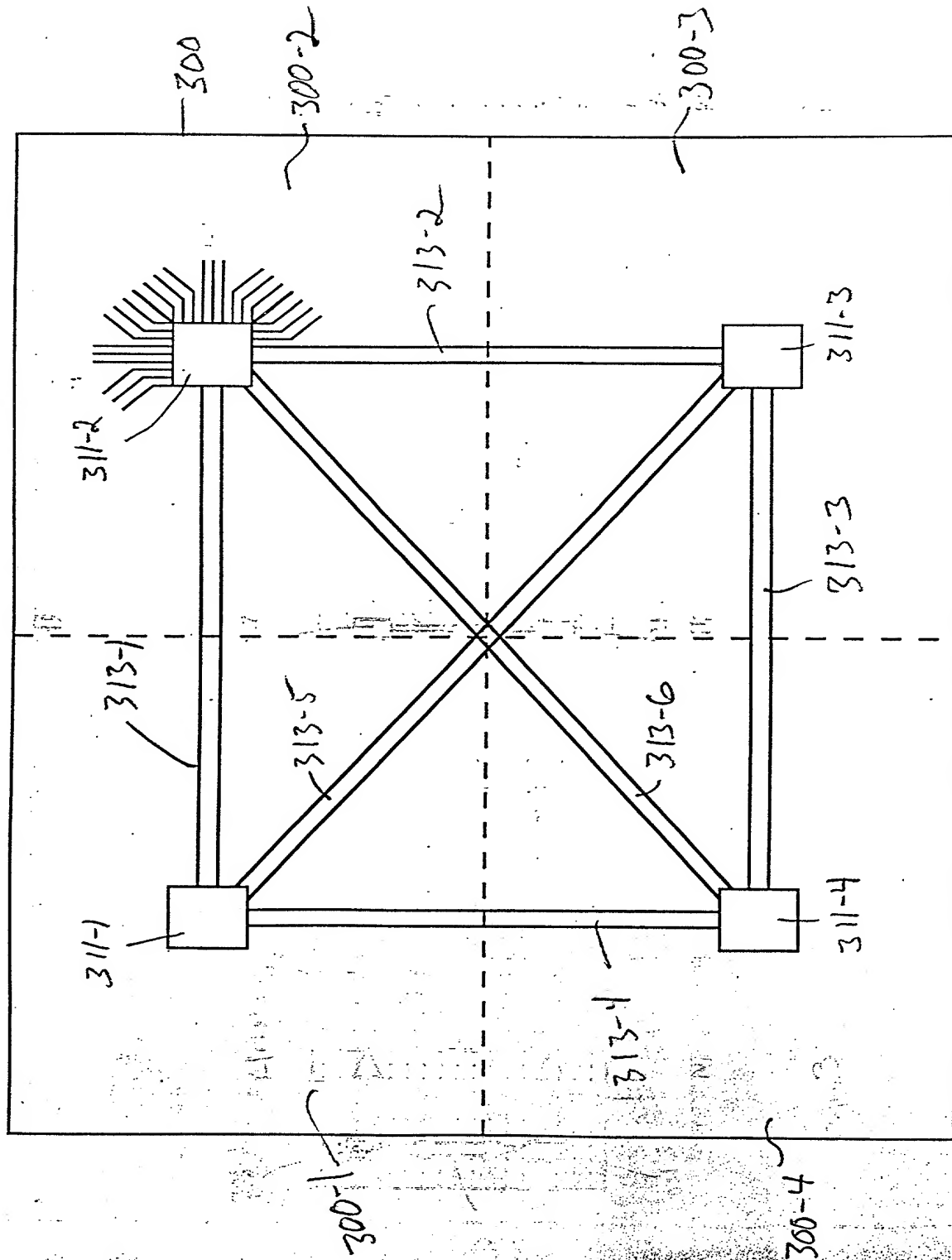


Figure 3b



# FIELD PROGRAMMABLE PCB

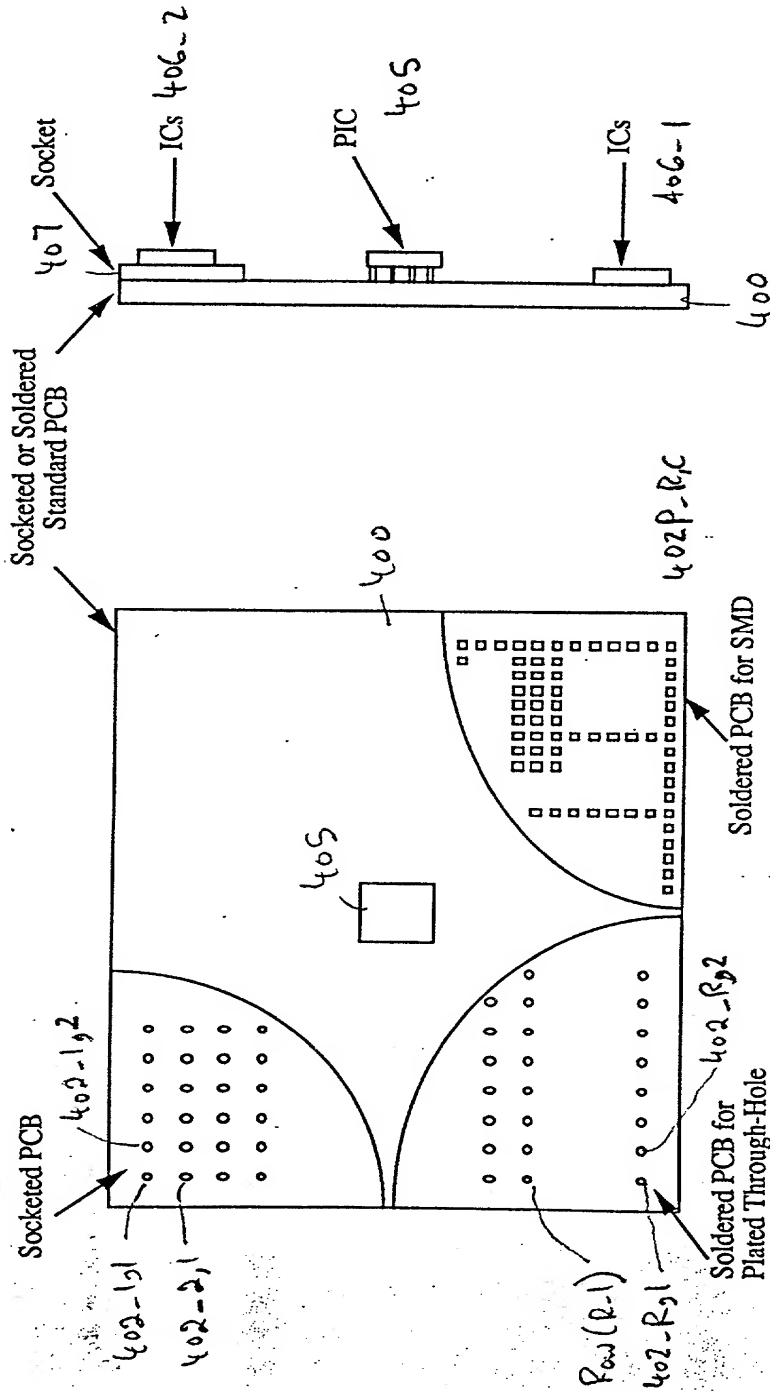


Figure 4a

Figure 4b

402-P-R,C



Figure 4c

407-P-R,C

# TESTPORT/DIAGNOSTIC TOOL

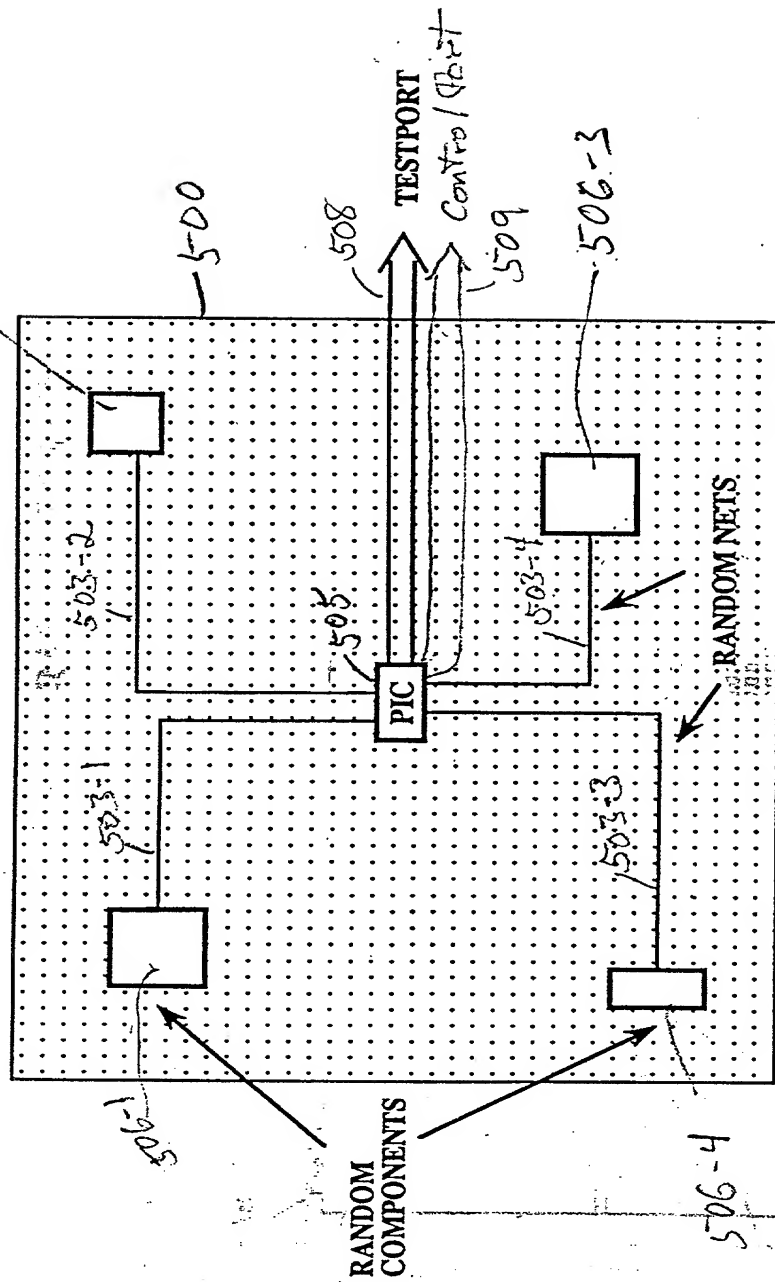


FIGURE 5

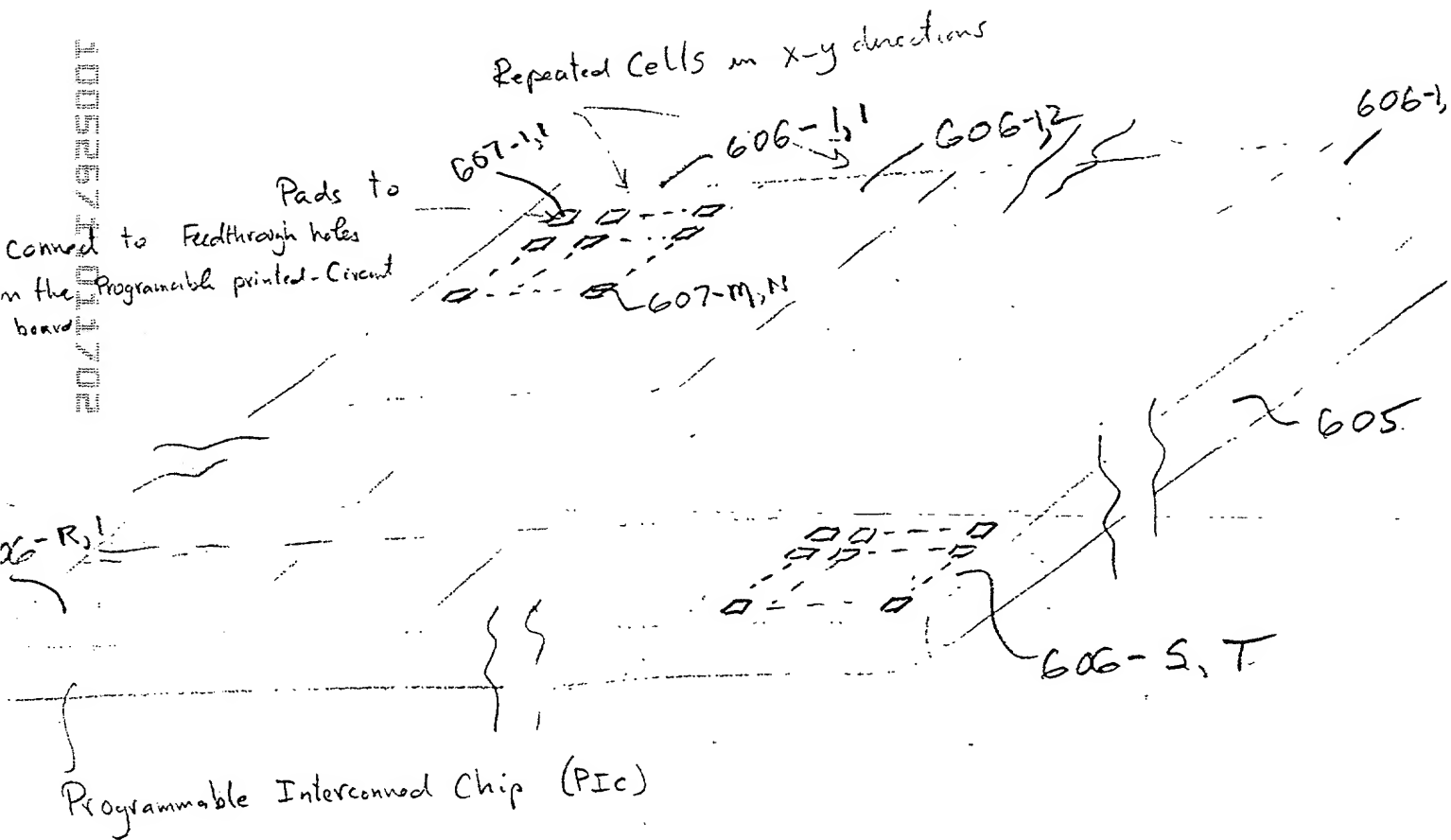
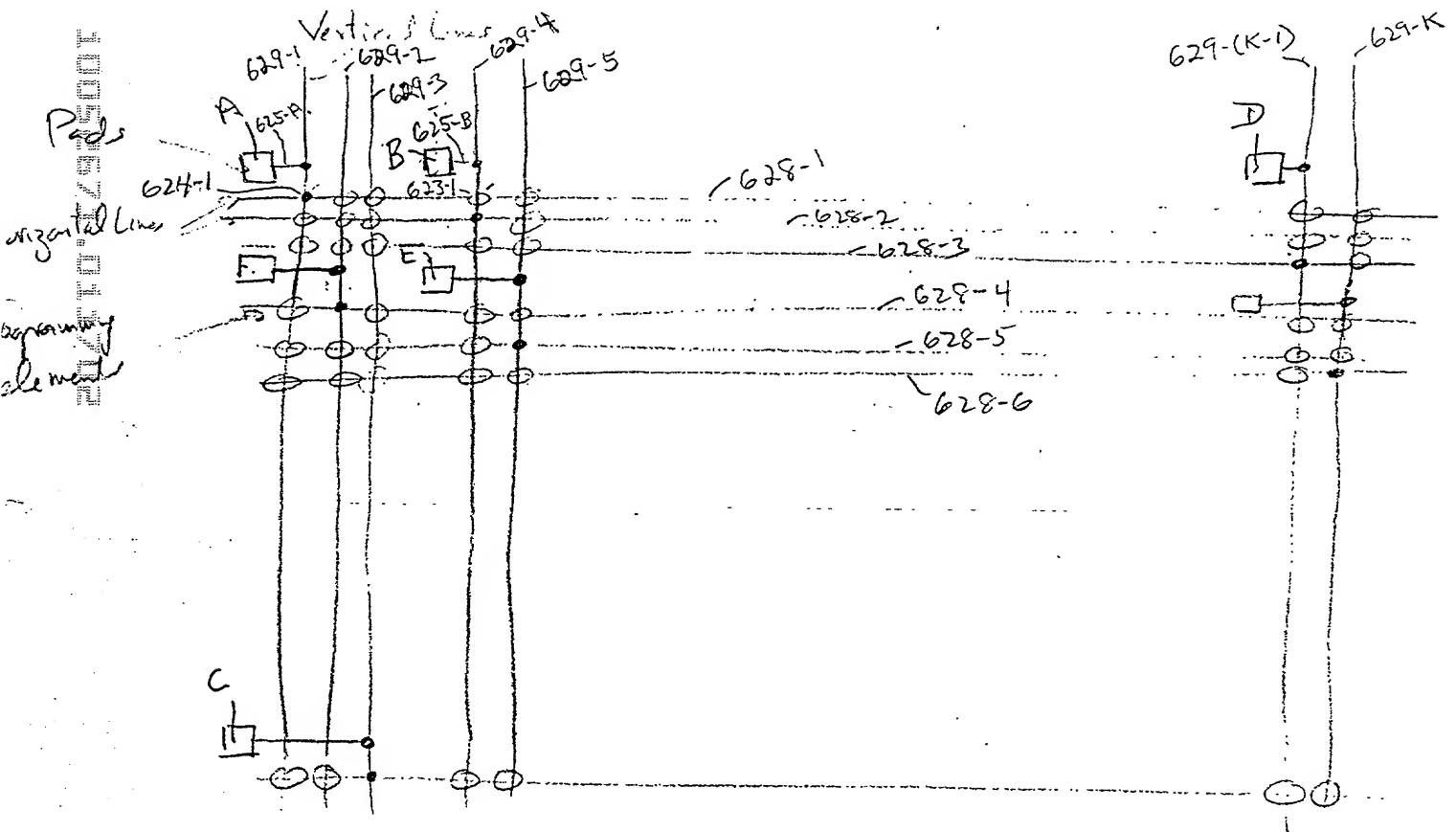


FIGURE 6a

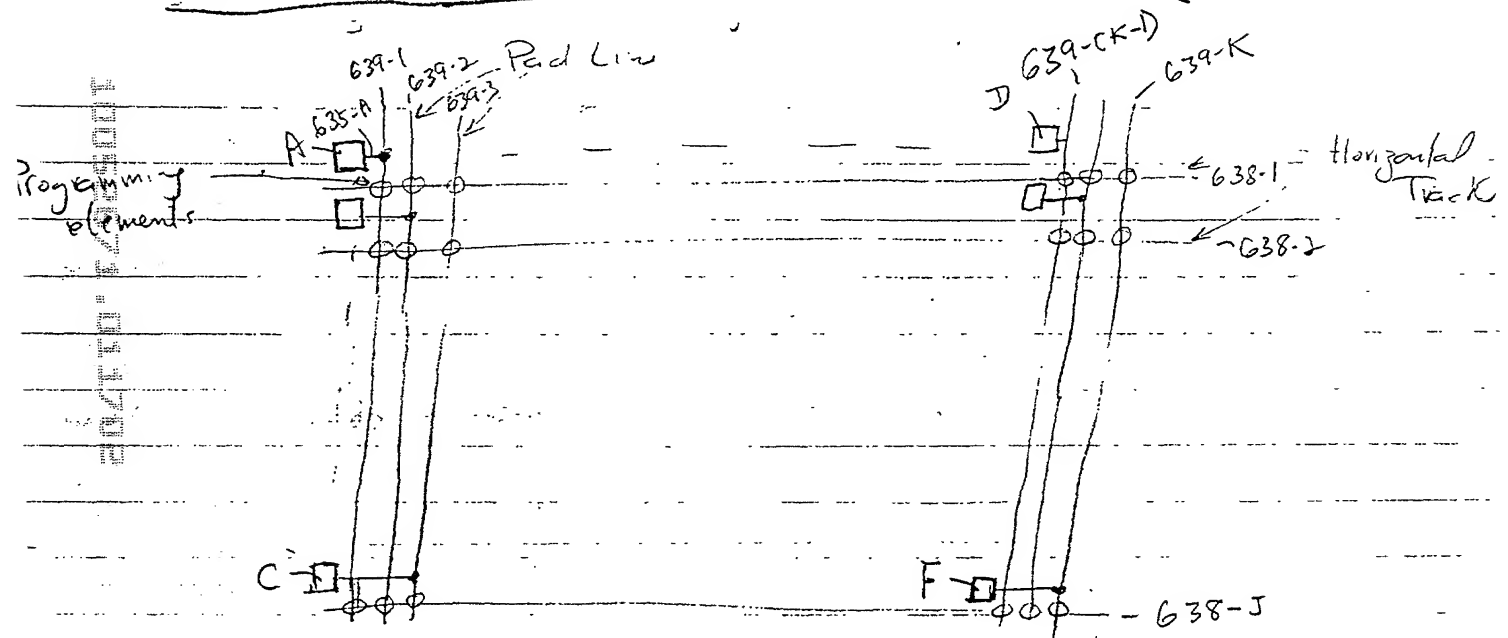


## Single Cross-point Switch-Matrix Array of PIC



- Each pad connects to a vertical line.
- Each vertical is connected to a horizontal lines
- Connection of one pad to another include one programming element only
- Inefficient as number of pads become large (eg 100 - 300)
- Total number of programming elements =  $(N_{\text{of Pads}})^2$

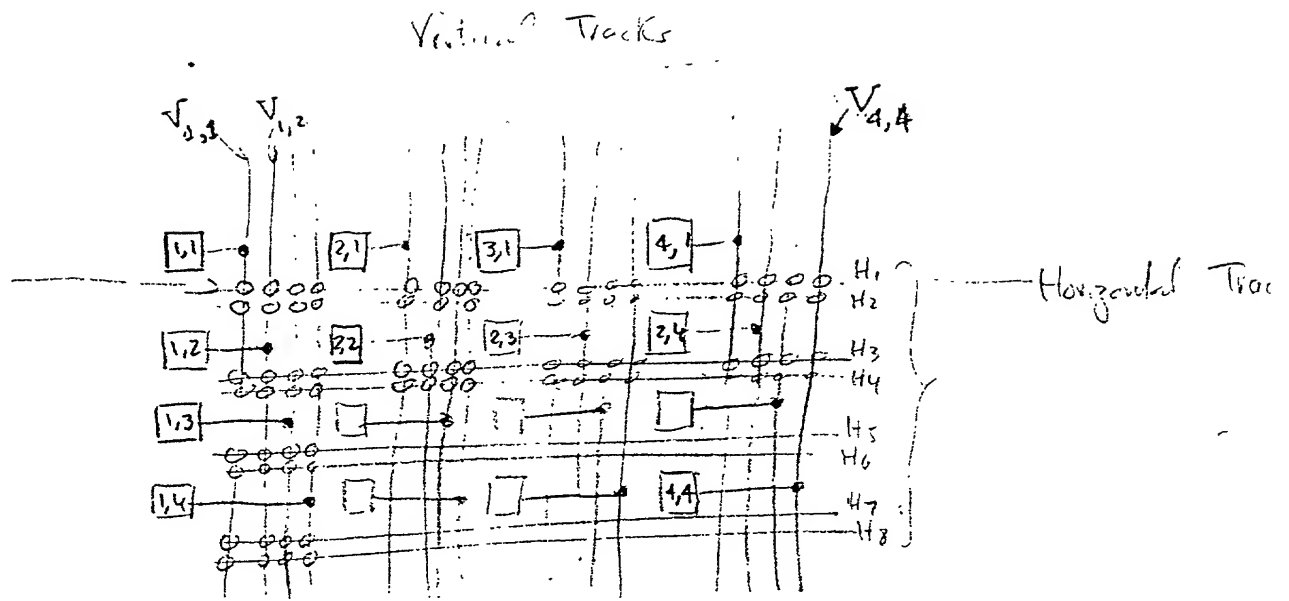
## Single Cross-point Switch - Matrix Array of PIC



- Each pad connected to a vertical line
- Number of horizontal lines  $\leq \frac{1}{2}$  number of vertical lines
- Connection of one pad to another include two programming elements
- Number of programming elements  $\leq \frac{1}{2} (\text{Number of pads})^2$
- Inefficient as number of pads become large (For example above 200-500)

FIGURE 6d

1005555001  
Program Elements



### Single Cross-point Switch-Matrix Array For 16 pads

To connect pad (1,1) to pad (4,1)

Program elements at Intersects of  $(V_{1,1} - H_1)$  and  $(H_1 - V_{4,1})$

To connect pad (1,2) to pad (4,4)

Program element at Intersects of  $(V_{1,2} - H_3)$  and  $(H_3 - V_{4,4})$

FIGURE 6E

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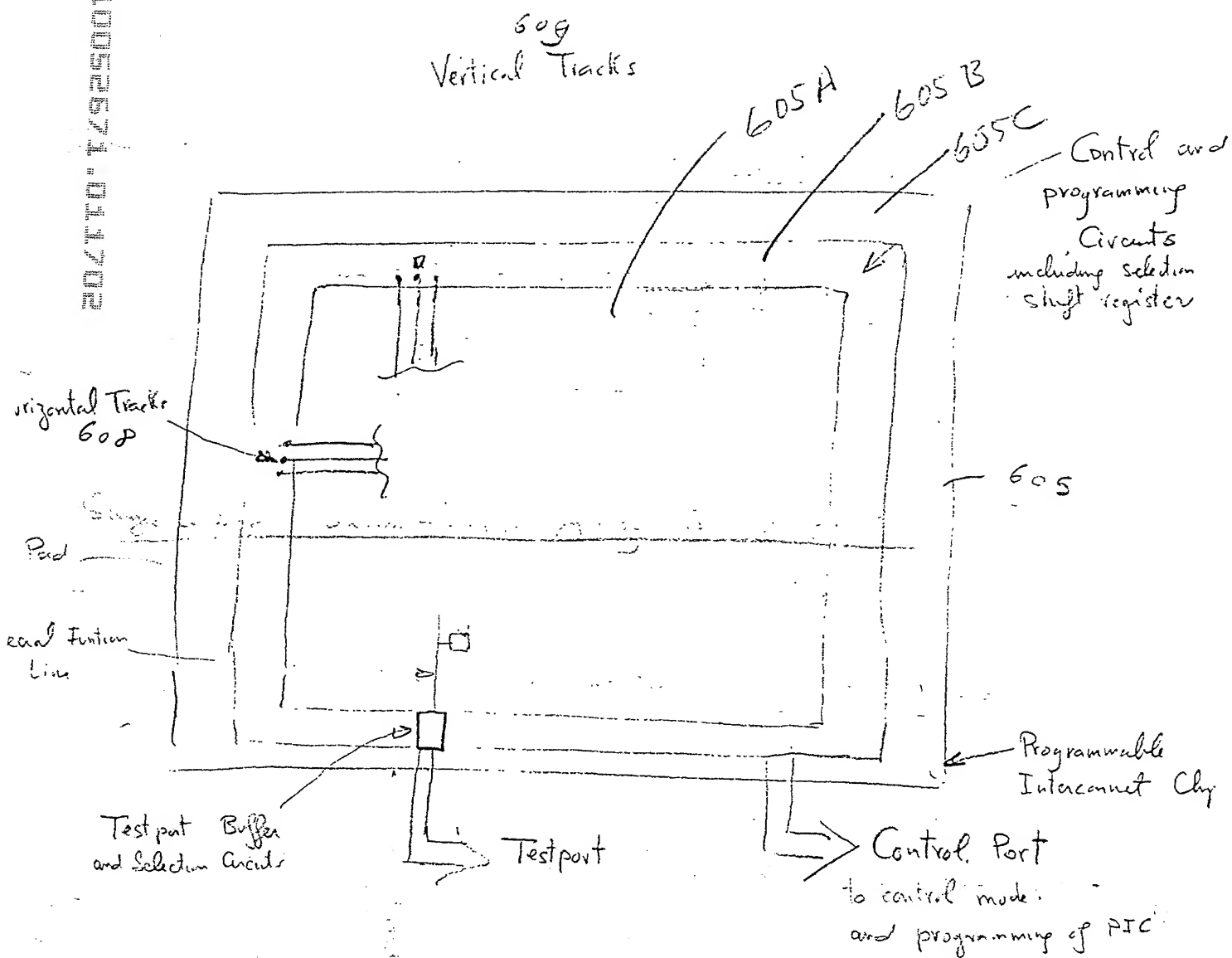
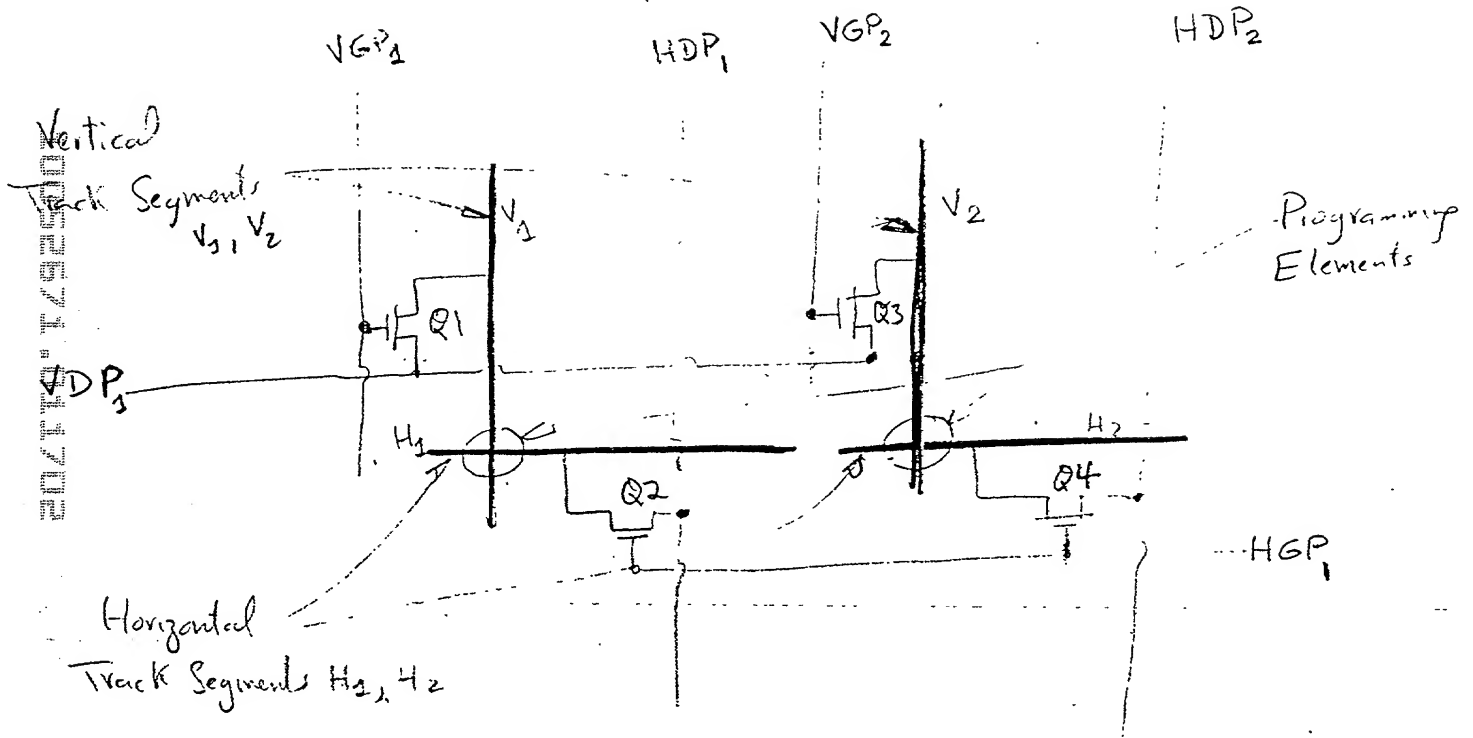


FIGURE 7a





Programming Scheme to select Horizontal and vertical segments in the PIC with only two transistor in Programming circuit path to allow current to reach hundreds of  $\mu$ Amps.

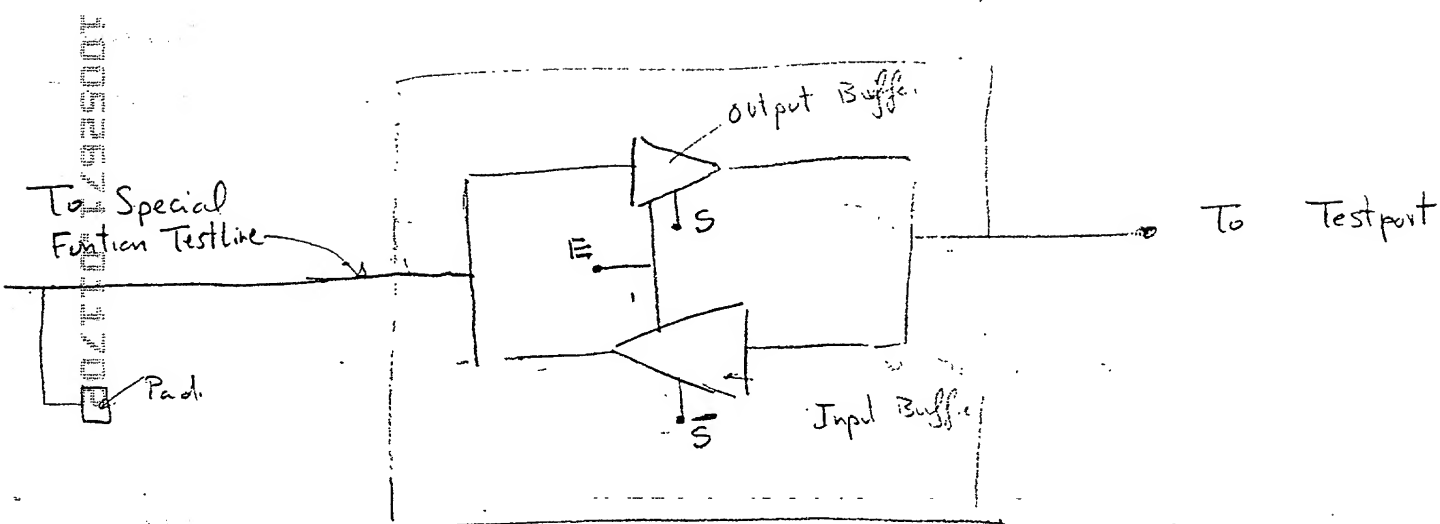
To program  $H_1$  to  $V_1$ , Take  $VGP_1 = V_{GH}$ ,  $VGP_2 = 0$ ,  $VDP_1 = V_{PP}$   
 $HGP_1 = V_{GH}$ ,  $HDP_1 = 0$ ,  $HDP_2 = 0$  or  $\infty$

Where  $V_{PP}$  is the programming voltage  $\sim 15$  to  $50$  Volts

$V_{GH}$  is larger than  $V_{PP}$  by transistor threshold voltage  $\sim 1.8$  to  $5.3$  Volts

Only Programming element at Intersect of track segments  $H_1$  and  $V_1$  see the full programming voltage  $V_{PP}$

FIGURE 17.2



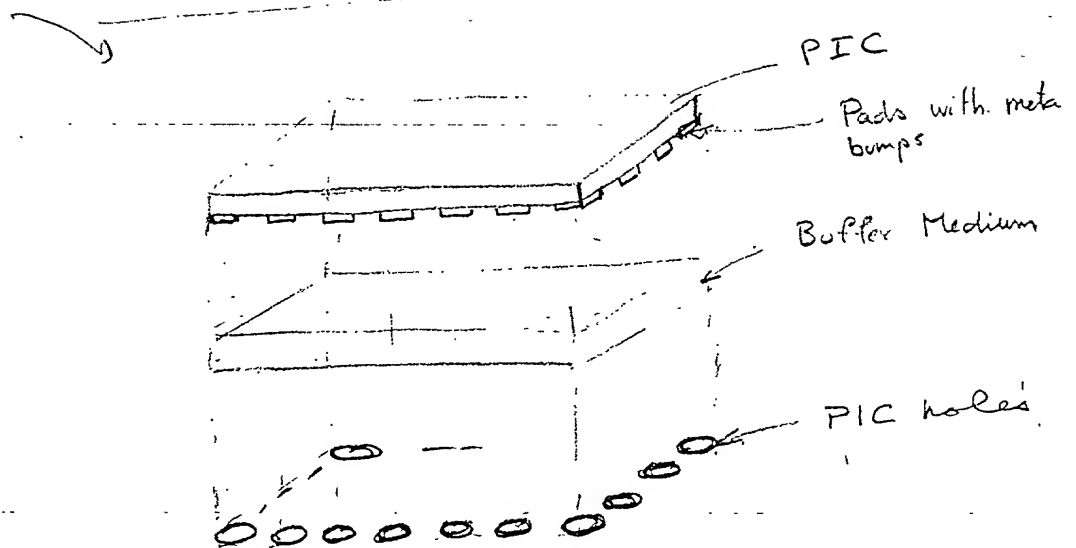
- S selects output or input buffer.
- E selects the pad to connect to test port

FIGURE 7c

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Printed-Circuit Surface

buffer



Buffer Medium ① Elastomeric material made of polymer with z-axis conductors  
25-100 mils thickness

② Carrier of Button springs

FIGURE 20

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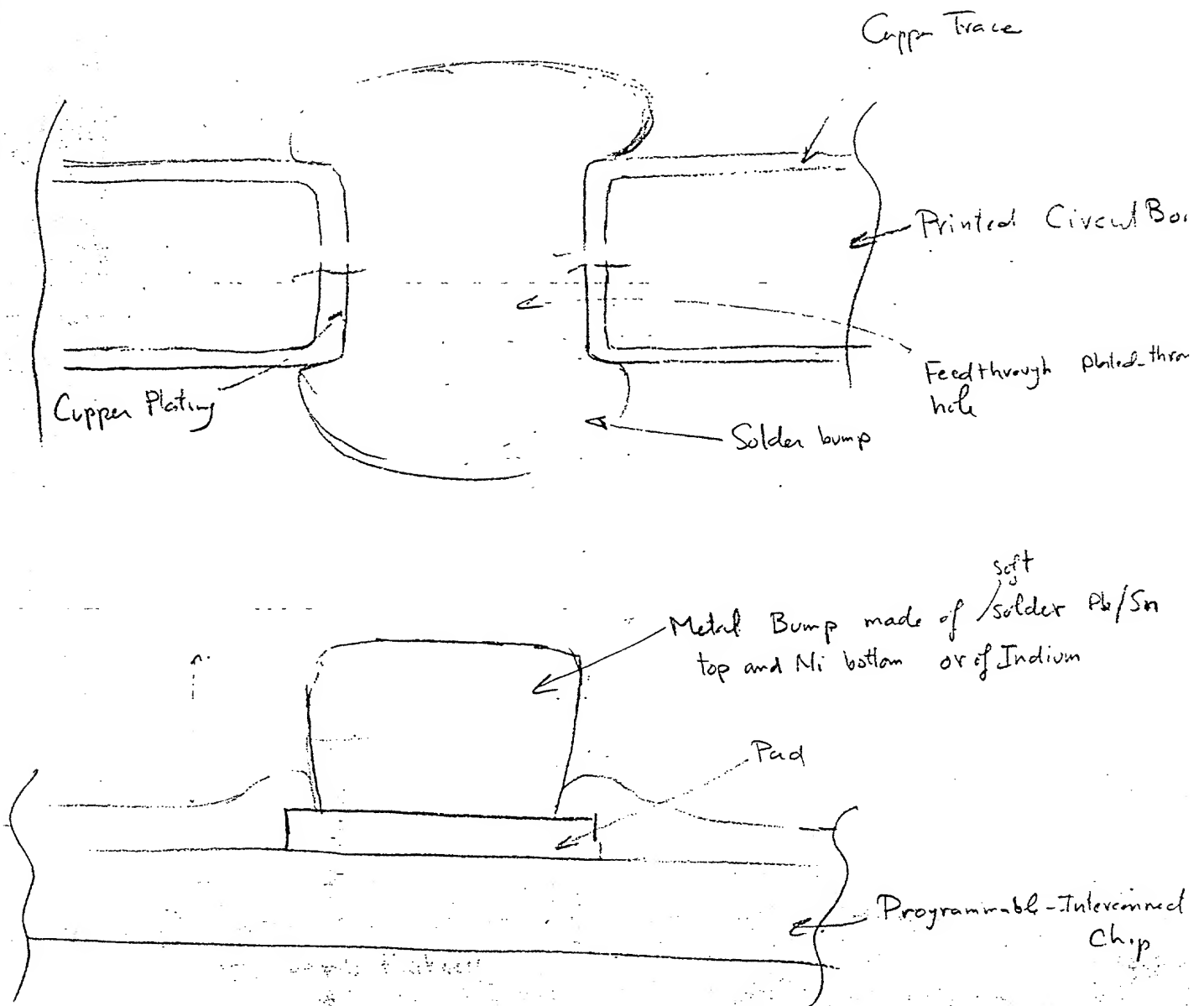


FIGURE 86